Journal of the Royal Society of Arts

NO. 4891 FRIDAY, 23RD JANUARY, 1953 VOL. CI

FORTHCOMING MEETINGS

WEDNESDAY, 28TH JANUARY, AT 2.30 p.m. "*Royal Portraits and Ceremonies: some new discoveries in Westminster Abbey*", by R. P. Howgrave-Graham, F.S.A., M.I.E.E., Assistant Keeper of the Muniments. C. K. Adams, F.S.A., Director and Keeper, National Portrait Gallery, will preside. (The paper will be illustrated with lantern slides.)

WEDNESDAY, 4TH FEBRUARY, AT 2.30 p.m. PETER LE NEVE FOSTER LECTURE. "*A Century of Photography*", by I. D. Wratten, President, Royal Photographic Society. E. Munro Runtz, F.R.I.C.S., Chairman of the Council of the Royal Society of Arts, will preside. (The lecture will be illustrated with a film and lantern slides.)

WEDNESDAY, 11TH FEBRUARY, AT 2.30 p.m. Two papers: (i) "*Increasing Beef Production*", by W. A. Stewart, O.B.E., M.A., B.Sc., Principal, Northamptonshire Institute of Agriculture; (ii) "*Increasing Milk Production*", by W. R. Trehane, Vice-Chairman, Milk Marketing Board. The Right Hon. the Earl of Radnor, K.C.V.O., a Vice-President of the Society, will preside.

THURSDAY, 12TH FEBRUARY, AT 5.15 p.m. COMMONWEALTH SECTION. HENRY MORLEY LECTURE. "*New Zealand's Place in World Trade*", by D. P. Taylor, M.Com., Trade Officer, Office of the High Commissioner for New Zealand. E. Marsden, C.M.G., C.B.E., M.C., F.R.S., Scientific Adviser in London to the New Zealand Government, will preside. (The lecture will be illustrated with a film. Tea will be served from 4.30 p.m.)

THURSDAY, 12TH FEBRUARY, AT 7.30 p.m. FILM EVENING. (The films to be shown are *The Train*, *Oil for the Twentieth Century*, and *Le Mans, 1952*. Details will be given in the next issue of the *Journal*.)

WEDNESDAY, 18TH FEBRUARY, AT 2.30 p.m. "*British Inland Waterways To-day and To-morrow*", by Robert Aickman, Founder and Vice-President, The Inland Waterways Association. The Right Hon. A. T. Lennox-Boyd, M.P., Minister of Transport, will preside.

SPECIAL MEETING OF THE COMMONWEALTH SECTION

The special meeting of the Commonwealth Section which, as announced in the *Journal* of 26th December, 1952, had been arranged to give Fellows of the Society an opportunity to meet The Right Hon. Sir Godfrey Huggins, C.H., K.C.M.G., Prime Minister of Southern Rhodesia, who is at the moment visiting this country, was held on Thursday, 8th January. Sir Godfrey, who was accompanied by Lady Huggins, having met Fellows on his arrival, in the Library, gave a talk on developments in Southern Rhodesia, and then answered questions. It is intended to publish a full report of the meeting in the *Journal*. After the meeting Sir Godfrey and Lady Huggins, with a number of members of the Council of the Society, were the guests of Sir Ernest Goodale, the late Chairman of the Council, and Lady Goodale, at a small dinner party arranged in their honour.

ROYAL PHOTOGRAPHIC SOCIETY'S CENTENARY

The Royal Photographic Society celebrated its first centenary on Tuesday, 20th January, 1953. During the morning of that day, at a gathering of representatives of kindred organizations, congratulatory addresses were presented to the Society's President, Mr. I. D. Wratten. The following address from the Royal Society of Arts, signed by Mr. E. Munro Runtz, Chairman of Council, Mr. P. A. Le Neve Foster and the Secretary, and executed by Mr. F. Wigzell, was presented by the Chairman of Council:

To the President and members of the Royal Photographic Society.

We are desired to convey to you the congratulations of the Council and Fellows of the Royal Society of Arts on the centenary of the foundation of the Royal Photographic Society.

The Exhibition of Photographs held in 1852 by our Society was only one instance of its continuing interest in photography; and we are proud to reflect that one result of that Exhibition was the establishment of your Society which now celebrates a hundred years of leadership in both the technical and artistic aspects of photography.

We are honoured to congratulate you on your past achievements and present prosperity and to look forward to a future as distinguished as your past.

Dated the 20th day of January, 1953.

On the afternoon of the 20th January, a lecture on "The Centenary of The Royal Photographic Society" was delivered in the Lecture Hall of the Royal Society of Arts by Mr. Bertram Sinkinson, a Fellow of both Societies; at the end of his address a vote of thanks to the lecturer was proposed by Mr. E. Munro Runtz.

On the same evening a Centenary Banquet, at which Their Royal Highnesses The Duke and Duchess of Gloucester were guests of honour, was held at Claridge's Hotel and attended by the Chairman of Council and the Secretary.

THE SCIENTIFIC FILM ASSOCIATION

The Scientific Film Association have kindly extended an invitation to Fellows of the Society to attend their showing of recent scientific films at the Society's House on Saturday, February 28th. The show will begin at 6 p.m., and last about one hour and a half.

Fellows who are interested should apply for tickets to the Secretary, Scientific Film Association, 164, Shaftesbury Avenue, London, W.C.2.

MEETING OF COUNCIL

A meeting of Council was held on Monday, 12th January, 1953. Present: Mr. E. Munro Runtz (in the Chair); Mr. F. H. Andrews; Sir Frank Brown; Sir Edward Crowe; Sir John Forsdyke; Mr. P. A. Le Neve Foster; Mr. John Gloag; Sir Ernest Goodale; Mr. A. C. Hartley; Dame Caroline Haslett; Dr. R. W. Holland; Lord Horder; Sir Harry Lindsay; Mr. Hugh Lyon; Mr. F. A. Mercer; Mr. J. A. Milne; Sir William Ogg; Lord Radnor; Mr. A. R. N. Roberts; Mr. Gordon Russell; Sir Harold Saunders; Sir Selwyn Selwyn-Clarke; Sir John Simonsen; Professor Dudley Stamp; Mr. L. A. Terry; Mr. William Will and Sir John Woodhead; with Mr. K. W. Luckhurst (Secretary) and Mr. R. V. C. Cleveland-Stevens (Assistant Secretary).

ELECTIONS

The following candidates were duly elected Fellows of the Society:

Ahmad, Professor Nayer Laiq., M.A., B.Litt., Bombay, India.
Bolton, John, Great Harwood, Lancs.
Buchanan, Thomas Alfred, D.S.O., M.C., B.Sc., London.
Cahn, Robert Sidney, M.A., D.Phil., F.R.I.C., Watford, Herts.
Cohen, Philip, Manchester.
Crabtree, Harold George, Birmingham.
Custance, Richard Martin, B.A., London.
Farrar Bell, Michael Charles, Haddenham, Bucks.
Groenewoud, Professor Philippus Wilhelmus Gerhardus, M.Sc., D.Phil., Bloemfontein, South Africa.
Halsbury, The Rt. Hon. the Earl of, F.R.I.C., London.
Height, Frank Sidney, London.
Hinks, John Geoffrey Ditom, Detroit, Michigan, U.S.A.
Holding, Frank Leslie, Manchester.
Inchbald, Michael John Chantrey, London.
Leggatt, Hugh Frank John, London.
Lloyd, H. Alan, M.B.E., F.S.A., Oxted, Surrey.
Lucas, William James, Bebington, Cheshire.
Lywood, Air Vice-Marshal Oswyn George William Gifford, C.B., C.B.E., Sevenoaks, Kent.
McComb, Leslie Robert, J.P., Sydney, N.S.W., Australia.
Moyse, S. Dickson, B.Sc., Beaconsfield, Bucks.

Norbury, Christopher Paget, B.A., Malvern, Worcs.
Northrop, David Kenneth, Nottingham.
Orchard, Professor Edwin Retief, B.Sc., Ph.D., Pietermaritzburg, Natal, South Africa.
Penny, Carlton Park, New York, U.S.A.
Pritchard, John Craven, M.A., London.
Prizeman, John B., Reading, Berks.
Richardson, Hugh, Guildford, N.S.W., Australia.
Rose, Hubert John Taylor, London.
Rosen, Jessel, B.Sc., F.C.G.I., M.I.E.E., London.
Smith, Cecil Gordon, Croydon, Surrey.
Tansley, Sir Eric Crawford, C.M.G., Chislehurst, Kent.
Thompson, Louis Lionel Harry, C.B.E., Purley, Surrey.
Turkel, Henry, M.A., M.D., Detroit, Michigan, U.S.A.
Warren, Mrs. Agnes Veronica, Regina, Saskatchewan, Canada.
Willson, Arthur Charles, London.

The following candidate was duly elected an Associate Member of the Society:

Foster, Miss Jill Le Neve, Sudbury, Suffolk.

ALBERT MEDAL 1952

It was reported that H.R.H. the President would present the Albert Medal for 1952 to Sir Frank Whittle at Buckingham Palace on Wednesday, 4th March.

PAPERS BY VISITING FOREIGNERS

A Sub-Committee of the Papers & Medals Committee was appointed to consider suggestions for the arrangement of lectures at short notice by distinguished foreigners visiting the country.

"NINTH EXAMINING BODY"

Dr. Holland and Mr. F. A. Wheeler (Examinations Officer) were appointed to represent the Society on the Joint Examinations Board of the "Ninth Examining Body" for the General Certificate of Education.

PROPOSED MEMORIAL TO JOHN NASH

It was agreed to appoint Mr. John Gloag to represent the Society at a meeting convened by the Mayor of St. Marylebone, to consider the erection of a memorial to John Nash.

CORONATION CEREMONY

It was reported that the Chairman of Council had been allocated a seat in Westminster Abbey for the Coronation Ceremony.

OTHER BUSINESS

A quantity of financial and other business was transacted.

THE EXPANSION OF FISHERIES IN THE COLONIAL EMPIRE

A Paper by

C. F. HICKLING, C.M.G., M.A., Sc.D.

Fisheries Adviser to the Secretary of State for the Colonies, read to the Commonwealth Section of the Society, on Tuesday, 25th November, 1952, with Sir John Simonsen, D.Sc., F.R.S., Director, Colonial Products Research, in the Chair

THE CHAIRMAN: It may perhaps seem to you somewhat anomalous that an organic chemist, whose many interests lie mainly in the chemistry of plant products, should have been asked to take the chair this evening. But, after all, fish do produce substances of great interest to chemists; and those who provide fish also are not sorry at times to call in the chemist to help them in the preservation of fish, and in methods for preparing such things as kippers. Again, some fish produce in their livers a hydrocarbon called squalene, which is very closely related to a large number of plant products. So perhaps the position is not quite so anomalous as it seems to be at first sight.

In this island, of course, fish supply us with protein foodstuff, and protein is something with which we are none too well provided. Even more is this the case in the Colonies, where foodstuffs containing proteins are in even shorter supply. It is therefore perhaps somewhat curious that until Dr. Hickling was appointed some seven years ago, no steps were taken in the Colonies to see in how far fish, either from the sea or from fresh water, could provide a food supplement.

I have had the pleasure of reading Dr. Hickling's Annual Reports, and I feel quite sure that when you have listened to him to-day you will feel, as I do, the highest admiration for the work which he has accomplished in this very short period of time. I will therefore call upon Dr. Hickling to read his paper.

The following paper, illustrated with lantern slides, was then read:

THE PAPER

Fishing is one of the primary producing industries, but it differs from other primary producing industries in that the fisherman usually has no proprietary rights in the fish which are destined to be the product of his industry. He may own the boats and gear necessary to catch the fish, but not the fish themselves until he has caught them. So it differs from agriculture, forestry or mining, where the owner, tenant or concessionaire has a proprietary right in the land and its produce.

Secondly, other primary producing industries can be carried on by individuals without necessarily affecting the results of other individuals. I assume that if, as a forester, I exploit my timber concession, I do not thereby diminish the yield of timber in my neighbours' concessions. The efficient farming of an

agricultural estate does not lessen the product of the surrounding farms. But a fisherman may be very much affected by the activities of other fishermen, since all may be exploiting the same stock of fish.

Thirdly, fishermen reap a crop which they have not needed to sow or fertilize or cultivate. Exceptions must be made for fish farming, which is allied to agriculture, and for shellfish beds; the generality holds good.

The economic consequences of these features of fishing, as a primary producing industry, give that industry all over the world its peculiar character and structure, whether primitive or advanced.

For example, a fisherman has usually very little to pledge in order to obtain credit. The agriculturalist can pledge his land and his growing crops, but the fisherman only his boat and equipment, which at peasant level may have but little value. Therefore, except in highly industrialized countries, it is difficult for a fisherman to better his lot because he cannot get adequate capital to improve his means of production.

The fisherman suffers further handicaps. If he is successful he may at once attract competitors, who may diminish his success by lowering his share of fish from the common stock which all are exploiting, or by reducing the price he gets for his fish. Then fish are rather unpredictable in their ways, and there may be longer or shorter periods when fish are scarce or lacking. Unless a man has been exceptionally thrifty and frugal during his successful times, he may not have the wherewithal to see him over bad times, much less accumulate capital for the purchase of better equipment. The element of luck in fishing does not encourage thrift.

So the self-employed fisherman is usually a debtor. As he has little to pledge as security for a loan, he must get an unsecured loan on what are usually onerous terms. The upshot is that in peasant communities the fisherman is a person of poor social standing, who may not even own the canoe and fishing gear he uses. His indebtedness has to be repaid by his delivery to his creditor of all the fish he catches, and at the creditor's valuation. When the fisherman is illiterate, as is usually the case, he may lose track of what he owes and what he has repaid. He is probably content that his creditor will see him through bad times, and give him the tools of his trade; meanwhile he lives.

I do not suggest that these creditors are always rapacious, nor that they do not perform a valuable function. They carry heavy risks in these unsecured debts; they may be cheated of a part of the catch, or the debtor may abscond. They perform a secondary service in acting as distributors of the fish produced by their debtors. Without them, at present there would be no source of capital for any fishery above the bare subsistence level. Moreover, they may themselves be working on credit, which they can obtain because they usually own land, shops, or businesses. But this system of indebtedness, so familiar among peasant communities, does not make for expansion, enterprise, and ambition. There can be no incentive to greater production where the creditor only is the immediate gainer; suggestions that his fishing techniques should be improved and modernized sound hollow where the fisherman not only cannot

raise capital, but is already in debt to an extent which he may not accurately know. The mental attitude finally reached may be that of the fisherman who said that it was best to be in debt, and the deeper the better; for the deeper in debt, the less likely is the creditor to let the debtor down. The apathy and laziness which many Fishery Officers and Administrative Officers have remarked among fishermen, their lack of interest and ambition, must surely spring from this age-old system. I am convinced that the expansion of fisheries in the Colonial Empire requires the modification or by-passing of this system.

Economic consequences may be followed further yet. In most Colonial territories fish are scarce and dear. For example, in Lagos fish from Great Britain can be bought in the cold stores, and are cheaper than locally caught fresh fish. Even in distant Singapore and Penang the same is true. This is because in Britain fish are caught by large and powerful fishing craft, with a very high rate of capture per man hour, and so a low cost of production. In 1951 for example, some 27,000 fishermen in England and Wales produced some 700,000 tons of fish, an average of 26 tons per man-year. The average quayside value was slightly less than fivepence halfpenny per pound. But in Malaya fish may be 1s. 6d. to 3s. per pound. The catch per man per year in Malaya averages less than one ton. Since the fisherman must live, and his creditor must live and make a profit, the small quantity of fish produced per man-year must be sold at a high price.

This contrast points clearly enough to the remedy: the expansion of the fisheries can best be got by increasing the catch per man-hour or per man-year. That will make fish cheaper and more abundant, yet there will be more money for the producer. Here and there it has been possible to get an increase by introducing better fishing nets which can be used with existing fishing craft. Nigeria, for example, have employed Gold Coast fishermen to teach the use of the more effective nets used on the Gold Coast, with successful results. But the type of fishing craft sets a physical limit on the kind of fishing gear which can be used and, generally speaking, fishermen have already discovered, over the years, the best methods to use with the fishing boats or canoes they possess. I should be the last to decry these methods: they show an uncanny understanding of the habits of fish and are the methods of the skilled hunter. But the catch per man-hour is generally low. The obvious way to raise the catch per man-hour is to call in the aid of the machine. The possession of an engine in his boat must greatly increase a fisherman's capacity to earn. He has a much wider radius of action, and can go to look for fish when his unmechanized fellows must, by comparison, wait for the fish to come. The power-driven boat can reach grounds inaccessible to the boat driven by wind or by hand, and so catch more fish because fewer competitors are working there. The power-driven boat can reach the fishing areas more quickly and stay there longer. Finally, he can work a greater quantity of fishing gear, and a greater variety of fishing gears.

You may well ask, if this is so, what prevents a rapid swing over from the unmechanized to the power-driven fishing craft, leading to a considerable increase in the supplies of fish without increasing the number of fishermen.

But in fact there are many difficulties and the process is likely to be slow. This results partly from conservatism, for we cling to what has served us well, partly from the low mental vigour and lack of education (in the wide, not the narrow, sense) among the fishermen, but chiefly, I feel, in the system of indebtedness which has been described above, and which is not only inimical to enterprise and ambition, but makes it impossible for the fisherman to raise capital.

The creditors who at present finance fishermen could in many cases raise the capital, but it is not always in their interests to do so. In the present state of distribution and marketing, it may suit them better to sell few fish at a high price than many fish at a lesser price. Those who are willing to finance more efficient ways of producing fish must first be convinced that these ways are in fact more efficient and more profitable. Someone must demonstrate, and this should be a government responsibility. So most of the British dependant territories have fisheries departments, charged with the duty not only of administering the fishing industry and the fishermen, but also of doing demonstration and educational work, including the demonstration of power fishing.

It is not suggested that big or expensive power fishing vessels are needed. Such vessels, which land most of the fish in this country, may cost up to £200,000, and cost £150 or more per day to run. But such costly vessels can pay their way here because catches in unit time can be extremely heavy, so heavy as to pay expenses with a profitable margin. But tropical seas are much poorer in marine life than temperate or sub-arctic seas, and I know of few places indeed in the tropics where an expensive fishing craft could pay her way; indeed there have been not a few failures by people who have tried.

So most of the thirty demonstration fishing craft in the Colonies are small, of forty-five feet or less in length, and are frequently open boats of the coble or surf boat type. An unexpected difficulty has arisen over the maintenance in commission of these power boats. Except in one or two of the largest towns in each territory, repair facilities and spare parts for engines are lacking. All types of machinery are liable to become faulty, but because repair facilities are so scarce, a motor fishing boat in most colonial territories must remain unserviceable for a disproportionately long period. No doubt, when motor fishing boats become numerous, local enterprisers may start repair shops to meet the demand. Meanwhile the present demonstration fishing craft suffer the fate of the pioneer; and a motor fishing boat lying unserviceable at her moorings, while the sailing canoes proceed to sea to fish, is poor propaganda for mechanization.

Mechanization has made best progress in Malaya and Hong Kong. In Malaya there are over 1,000 motor fishing craft, ranging in size and power from sixty or even seventy foot purse seiners, to the usual sailing and oared fishing boats equipped with outboard motors. Here, at all events, capital has been found, for even an outboard motor of the type and power most popular costs some £60. Motor-driven boats catch five times as much fish in unit time as the same type of boat without an engine. There has been a small beginning with the installation of inboard engines. Under their experienced and energetic Fisheries Department we can now expect accelerated progress, for not only are genuine motor fishing

boats (as contrasted with the existing sailing boats equipped with an engine) now being demonstrated, but this autumn a Scottish fishing boat and crew are to show a fishing method which is superior to existing methods because far fewer men are needed to work it. This, again, will lead to an increased catch per man hour.

In Hong Kong there are over 150 fishing junks equipped with engines. Their average catch is twice that of the sailing junks. But these 150 vessels are only about two per cent of the Hong Kong fleet. Now, progress is in the direction of building fishing craft designed to take an engine, the logical successor to the sailing vessel equipped with an engine.

On the Gold Coast, the two government demonstration motor boats outfish the local hand- and sail-propelled fishing boats by up to six to one; as inshore trawlers they catch an average of one pound of fish per minute. The running expenses of these twenty-eight foot motor boats are low.

Now, I learn that fishing pinnaces in Mauritius, which have been fitted with small engines, catch more than ten times as much fish as similar boats propelled by sail. Fish traps are used by both types of boat ; but the power boat can set its traps over a much wider area and in deeper water, and it can operate several times as many traps as the slower sailing boat.

It is therefore in line with common sense, and in line with the history of the expansion of our own fisheries, that the machine must be brought to the aid of muscle, and that the result will be an expansion of the fisheries and their products. What seems to be most needed is continuous long-term demonstration and propaganda by governments, and easier and more abundant credit for the fishing industry. With regard to the first, few Colonial governments are wealthy, and there are innumerable calls on their funds. For example, there are education and communications, without which the fishing industry itself could not expand very far. With such a host of pressing needs, it may not be surprising that governments are not always willing to spend enough money on developing their fisheries, nor are they always willing to see fishery development as a long-term commitment. In my opinion, this is partly due to the very nature of fishing, defined at the beginning of this paper, which makes the need for expenditure on fishery development less obvious than in the case of other industries. Yet we are told that an adequate supply of animal protein is necessary for the whole and fit man; the expansion of supplies of meat is a much slower process, and a costlier one, than that of fish, which is almost everywhere acceptable to the consumer.

As to supplies of credit: co-operative movements, unless they are backed by government capital, may be inadequate to meet the initial stages of mechanization, for a small motor fishing boat will cost anything from £500 upwards. Government development loans, such as those made by the Rural Industries Development Authority, which is doing such fine work in Malaya, must probably bear the brunt in the earlier stages. But, again, for the reason given at the beginning of this paper, credit must be given on terms quite different from those offered to other rural industries. And where should we find a government

agency which will give a substantial loan without security, and simply on a man's known character and integrity?

I am not very worried about the marketing and distribution of increased catches of fish. True, if the increase were sudden, there might be chaos; but the switch over to power-driven boats will be gradual. It took seventy years, in this country, to complete the change over from sail to power, for the first genuine steam trawler was launched in 1882, while the last sailing trawler was laid up in 1946. The change may well be swifter in the Colonies, because motors for fishing craft are easily acquired, at a price, and the advantage conferred by an engine, once demonstrated effectively, may cause a demand limited only by the availability of the capital on reasonable terms. But the fish distributor, unlike the fisherman, is usually a person of some substance, who could find the means to handle larger quantities of fish should these become regularly available.

As to over-fishing, which in this context means a subdivision of the catchable stocks of fish among too many boats, leading to an uneconomic industry: with the increase in range conferred on power boats, and the consequent probable exploration of new grounds, I doubt if this is a problem likely to arise generally within the next few years. As to the allied but somewhat different problem of biological over-fishing, that is, taking from the sea more than the sea can replace: we have a number of fishery research stations established or being established, and the work of these stations will indicate, among many other things, the productivity of the local waters, and therefore give some guide to the maximum weight of fish which can be annually removed on a permanent basis.

So much, and too briefly, about the expansion of the wild fisheries. Now I have time to say something about fish farming. I do not want to give the impression that fish farming is an unimportant annexe to fishery work in the Colonies. On the contrary, I regard it as being of equal importance to all other aspects of fishery development combined. Fish farming is no novelty. It has been estimated that half a million tons of fish are produced annually in the world from fishponds. But almost the whole of this vast production is in the Far East, mainly in China. There is scope for a fundamental contribution to the feeding of mankind in transplanting this technique to territories and peoples to whom its possibilities are unknown, and I believe the Colonial Office can take some credit for the world-wide interest now being shown in this subject.

In this country, the stews or fishponds were a regular feature of the old castle, manor and abbey; here fish, chiefly carp, were bred, to give a sure supply of fish for feast days and fast days. Was it not Chaucer's Franklin of whom it was said, "Full many a bream and luce he had in stew". The remains of the fishponds can often be seen in the grounds of old abbeys and manors, sometimes in a surprisingly good state of preservation after the lapse of the centuries. In the library of the British Museum there is a text book on fish farming dated about 1750, but fishponds generally must have died out between then and 1800, when the supplies of sea fish became more easily available on the tables of the gentry, due to the expansion of our fishing industry and improved communications. I know of only one fish farm at present in full production in this country,

and that farm is operated by a Dane. He rears trout for the table, using fish scrap as food. We have many trout breeding establishments, but they chiefly produce fingerlings and eggs for river stocking purposes.

In many parts of Europe, where sea fish are scarce and dear, fish farming is a well-established industry; there were some huge fish farms, up to 4,000 acres, in Hungary and Jugoslavia, and a few of 2,000 acres in Eastern Germany. Before the war, some ten per cent of freshwater fish available in Germany came from fishponds.

Now fishponds are nothing but areas of land surrounded by embankments, usually about six feet high, and perhaps twenty-five feet wide at the base. Water is brought in channels from some stream or spring to fill the ponds and keep them full when required. But it is a mistake to assume that land so embanked is lost to agricultural use. On the contrary, a wide variety of crops, including irrigated crops, can be and are grown in fishponds, in rotation with fish; a dry period, when land crops can be grown, is everywhere regarded as improving the fertility of a fishpond. So fish farming is an elastic technique, and opens a wide choice before the farmer's ingenuity and the state of his markets. Fishponds can be put up on very poor land, of marginal or no agricultural use, and the rearing of fish improves fertility, which builds up through the years. The biological processes involved have been but little studied, though the Germans have published a great deal of most valuable work. Why, for example, should fishponds seem to produce much more than the same land produced before the fishponds were built. In Central Africa, some fishponds are producing over 1,000 lbs. of fish per acre annually, where the land previously produced, by grazing, less than one hundredth of that weight of beef. We in the Colonial Office have long planned a fish farming research station to go into these fundamentals, on the same scale as a first-class agricultural research station. But we planned to establish this station in Malaya, where fishponds are part of the landscape; you will all know that conditions in Malaya are not normal, and we are having great difficulty in getting this station started.

What more can I say in the short time I have left about this very big subject? Fish can be grown in ricefields, rice can be grown in fishponds. Fishponds can be in brackish water, fed by the estuarine tides, and reclaimed from salt swamp or mangrove swamp, or they can be wholly in freshwater. In either case, fish can be raised either extensively, using only the natural fertility of the soil and water, or intensively using fertilizers to increase the natural food of the fish, and food for the fish themselves. In the latter case, the waste products of the fish so fed add to the fertility of the pond. Fishponds are run in conjunction with pig and duck industries; in the case of piggeries, the food supplied to the pigs serves a double function. It fattens the pigs for market, and the excrements of the pigs passes on into the fishponds to nourish the food on which the fish feed. It is very economical. I myself feel that the future lies more in the study and the application of inorganic fertilizers to fishponds. This is because waste foodstuffs, genuinely surplus to human requirements, are likely to grow scarcer as population pressure increases. So a fish farmer cannot count

indefinitely on getting food for his fish. As to organic fertilizer, such as manure, this also is likely to become scarcer as more intensive cultivation of the land develops. But German research has shown that very great increases in the yield of fish can be secured by the treatment of the water in the fishponds with lime and superphosphate only, and we should apply this finding, and elaborate it, in tropical fishponds.

The first cost of a fish farm may be substantial: it is represented chiefly by the labour needed to put up the embankments, and to level and dig the water channels and build the sluices. But once these are built, they may last for generations; so capital could be repaid over a very long period. Here again, however, expansion depends, first, on successful demonstration fish farms, and secondly, on the availability of capital for putting up further farms. We come back to the same factors, namely, the willingness of governments to spend money on demonstration units, and the supply of capital on reasonable terms. Most of our Colonial territories are now putting up demonstration fishponds.

In conclusion, I should like to pay my public tribute to the stout-hearted band of Colonial Fishery Officers who are striving, sometimes under heartbreaking difficulties, and sometimes with but meagre financial support, to secure expansion in the fisheries of the Colonial Empire.

DISCUSSION

THE CHAIRMAN: In the first remarks I made I said that I thought you would share my admiration for the work which Dr. Hickling has carried out, because the advances of which he has been telling us to-day are really entirely due to his own personal efforts. I am sure that many of you here would now like to ask questions.

I should like to ask, first of all, whether there is any explanation for the fact which Dr. Hickling mentioned quite early in his paper, that tropical seas contain comparatively few fish. Is that due to the absence of seaweed or fish food?

THE LECTURER: There are others here who can probably answer that better than I can. I think the main reason is the absence of winter, which means that there can be no overturn of water. In this country during the winter the bottom of the water comes to the surface, and brings with it the nutrient elements. In the tropics the water tends to be covered by an unvarying sheet of warm water, which prevents the upturn of the lower layers.

THE CHAIRMAN: It is really a shortage of food, then, as I suggested. The other question I wanted to ask was prompted by the beautiful picture we were shown of fishponds in the tropics. How far is there a risk of disease being spread, as a result of them, by mosquitos and so on? Do the fish eat them?

THE LECTURER: Wherever fish farms are spoken of, we are up against the legitimate fears of the health authorities. I think the answer is that if a fishpond is well cared for and if the vegetation is kept trimmed, and above all if vegetable-eating fish are stocked (there are quite a lot of fish in the tropics, although very few in this country, I believe, which live on vegetables), the danger is very small. In the case of bilharzia, a horrible tropical disease whose intermediary is the snail, which is another serious danger, our laboratory in Uganda is studying the feeding habits of the fish; and already they have discovered a number of species which seem to have a preference

for molluscs. Given molluscs and other food, they prefer the molluscs. That is an interesting possibility. If you can stock ponds with mollusc-eating fish, the bilharzia will be prevented.

MR. ROBERT CLARKE: With regard to the question of the abundance of fish in tropical waters, I think it is wrong to suppose that tropical seas are always, necessarily, poor in fish compared with sub-polar and temperate seas. I recollect that in October, 1950, in 20° South off the coast of South-West Africa, the R.R.S. *William Scoresby* ran into great shoals of herring-like fish, and I calculated that they passed, during a period of nearly an hour, at the rate of 40 to 400 fish per second—a remarkable quantity, which suggests that at times there may be large numbers of fish present in the tropics.

Also, one occasionally comes across great flocks of birds apparently feeding on fish in tropical waters, and these flocks are comparable in size to bird flocks in polar seas.

MR. M. J. HOLDEN: What are the difficulties of preserving these large catches of fish in hot climates? Are the boats provided with refrigeration services? Also, would the lecturer please say something about the problem of transporting the fish from the markets to the population without its rotting?

THE LECTURER: Generally speaking, each territory has learned the method of preservation most appropriate. Although many of these methods seem very crude and the products not very savoury, in actual fact "the customer is always right". I myself did not realize quite what the functions of high fish were until I was 70 miles up the West River in China and bound to eat Chinese food (which I quite like). I realized then that when you are tackling an enormous mound of boiled rice, you really do need something to help it down—and very high fish has a most powerful stimulating effect on the salivary glands!

MAJOR H. W. HALL: I can bear out what the lecturer said, more particularly in regard to mullet that is caught in the Red Sea. It is caught by Egyptian fishermen, salted down by most crude methods and stored in barrels. You can smell these barrels of mullet at very long range. But I understand that if you salt them down properly the Egyptians will not eat them!

MR. R. HAMOND: Might I ask whether, in any of the Colonies, any by-products of the fish are used; whether for instance fertilizer or food for domestic stock is made at all? Also whether such things as crustaceans or molluscs are employed for food, as well as boned fish, as crabs and lobsters are in this country.

THE LECTURER: The difficulty is that in almost all the Colonial territories fisheries are carried on at a large number of small stations; it only pays to use by-products if you can get a large bulk of them easily without high transport cost. It is fairly easy in this country where you have gigantic ports such as Grimsby and Hull with big fishing factories attached to them. But in countries like Nigeria and Malaya, where there are thirty, forty, fifty, even a hundred small stations, it just would not pay to bring the offal together in one place where you could process it. Generally speaking, apart from the use of fish bladders for making isinglass, and a certain amount of extraction of liver oil—which is partly used for medicinal purposes and partly used, for example, for painting boats—apart from a few cases of that kind I do not think any by-products are collected; especially as the customer in the tropics generally prefers his fish ungutted. It appears to be a fact that for the first twenty-four hours fish keep better ungutted. After twenty-four hours, of course, they are better gutted and put on ice. So the by-products and liver are just not available because the customer usually wants his fish intact.

Crustacea, and especially prawns, are very important, and in many territories may form a high percentage of the quantity, and especially the value, of the fisheries. Molluscs, such as oysters and clams and cockles, are also important; the *abalone* and *strombus* are luxury products.

SIR SELWYN SELWYN-CLARKE, K.B.E., C.M.G. (Chairman, Commonwealth Committee): Would not Dr. Hickling agree that the apprehensions which the Chairman expressed in regard to the dangers to health from fishponds breeding mosquitos and so on, are met, in all properly conducted fishponds, in two ways? First of all by the use of "millions", or a similar fish of the Gambusia family, used in Barbados and elsewhere, and which we found very effective in West Africa in the earlier days before the discovery of Paris green and various other mosquitocides and larvicides. Secondly, from the fact that in Malaya, for example, the worst carrier of malaria, the *Anopheles maculatus*, does not care for the high organic content of the water in these ponds. In fact, one way of dealing with hill streams and seepages is deliberately to pollute them, because the *maculatus* will not breed in such conditions.

THE LECTURER: I am very grateful for that; it adds to my knowledge. Is it not the case also that manuring makes the water more alkaline? Might that not also play a part?

SIR SELWYN SELWYN-CLARKE: That is quite true.

A vote of thanks to the lecturer was then carried with acclamation and the meeting ended.

One of the photographs taken by members of the audience during the lecture on "Photography and its Uses"

PHOTOGRAPHY AND ITS USES

A Dr. Mann Juvenile Lecture by

D. A. SPENCER, Ph.D., D.I.C., F.R.I.C.

Past-President, Royal Photographic Society

Friday, 2nd January, 1953

More than 2,000 years ago men knew that light admitted through a small hole could cast an image of brightly lit objects on to a screen. They also knew that many substances (our skin for example) are darkened by exposure to sunlight. About 150 years ago people in various parts of the world were attempting to combine these two observations in order to make records of natural objects. A little over 100 years ago some of them in France and England succeeded, and photography, as we now understand that word, came into being.

The lecturer here demonstrated the basic principles of photography.

You have seen how a pinhole casts an image; how a lens casts a brighter image; how this image can be recorded, in latent form, as an invisible change in the nature of silver salts imbedded in gelatine, and how this latent image can be developed by chemical conversion of the light-altered silver salt to black silver. Because, wherever light falls black silver is produced, this image is a "negative one", for the brightest parts of the scene are the darkest parts of the record.

However, if this record is made in silver salts supported on a transparent base such as glass or plastic film, it can be printed on to a similar silver salt layer coated on paper by passing light through the "negative" to the sensitized paper. Again a reversal of tones takes place and the final print, therefore, has its dark and lights disposed as they are in nature.

All these processes, difficult to follow in words, were shown in action by a combined cartoon and live action film on which the lecturer gave a running commentary.

Members of the audience were supplied with a simple camera fitted with a flash lamp, and photographed each other and the audience, the films being processed and prints made while the lecturer proceeded to describe some of the modern applications of photography.

Surprisingly, it appears that materials for amateur snapshots—which is what the word "photography" means to most of us—now form a relatively small part of the modern photographic manufacturer's output. Photographic material for cinema films, for radiography, for document copying and for use by the printing industry are being used in ever-increasing amounts, and in Great Britain, of necessity, have a prior claim on the manufacturing and raw material facilities available.

Even in America, where the amateur photographer can buy all the materials he wants, over one-quarter of all the photographic paper made is used for document copying. However, some of the most interesting and important applications of photography use very little material. A single photographic plate exposed to radio-active material will record the life history of an atomic

disintegration in the form of silver tracks and analyzing all the evidence recorded in one plate may take a nuclear physicist many months. Then again, relatively few photographic plates are used by astronomers, though the camera has now become the main means of recording astronomical data. Because the photographic plate can be made infinitely more sensitive to faint light than the eye; because it can record an enormous amount of data for subsequent measurement and study, it is the most powerful and useful tool the astronomer possesses after the telescope itself, and all our present knowledge about the size and composition of the universe is deduced from photographic records of the stars. The methods used by the astronomer to determine what stars are made of are used by industry to analyze alloys. Instead of spending hours in laborious chemical analysis, the metal to be analyzed is heated by electric discharge and the emitted light photographed through a spectroscope. By measuring the relative positions and blackness of the lines which constitute the resulting photograph, the percentage composition of the alloy is accurately determined from less than a square inch of photographic material.

During the recent war many banks adopted the plan of photographing every cheque that passed through their clearing houses so that, even if such cheques were destroyed, a record existed to safeguard the customer and the bank. Only a very tiny photograph is necessary in such cases (about $\frac{1}{4}$-inch square) and the cheques are photographed in succession on thin strips of photographic film. So useful did this system prove in many ways that now most big banks use it. So for that matter do football pool promoters, since making a photographic record of the forecasts before the matches are played is a safeguard against subsequent forgery.

The recent war gave a tremendous impetus to all branches of applied photography—that is photography used as a tool rather than as a medium of entertainment. As an example, eighty per cent of all the intelligence information we obtained about occupied Europe during the war came *via* air photography. Some of the most important applications, however, are based on photographs which are not "pictures" in the conventional sense at all. The X-ray shadow photographs called "radiographs" are a typical example, and the amount of photographic film used in Britain for making radiographs nowadays is at least twice as great as the amount used for making roll films.

Every day photography in its many forms is helping the nation to become more efficient and those of you who use it merely because it is a fascinating hobby can help in this by learning to use your cameras properly and so avoid wasting the precious raw materials upon which all forms of photography depend.

As a concluding demonstration the lecturer performed a sleight of hand trick with a rope. Then by means of a slow-motion film of the trick, he showed how high-speed cinematography could reveal clearly details which escaped the unaided eye. Finally, he supplied members of the audience with ropes and by means of lantern slides showing each step in the illusion he taught them how to perform the trick.

At the end of the lecture the audience went downstairs to the Library, where the Society entertained them to tea.

GENERAL NOTES

MATISSE EXHIBITION

The exhibition of sculpture by Matisse now being held at the Tate Gallery, which has been arranged under the supervision of the artist himself, will remain open until February 22nd. This is the first opportunity which many people in England will have had of seeing any of Matisse's sculpture; forty-nine bronzes, practically his whole output, are being shown. The exhibition also contains three of his paintings executed during the early years of the last war together with preliminary studies and photographs showing the stages in their development.

The exhibition is open to the public on weekdays from 10 a.m. to 6 p.m., and on Sundays from 2 p.m. to 6 p.m.; admission 1*s*.

COUNTRY TOWNS CONFERENCE

The Country Towns Committee of the Town and Country Planning Association has, since 1942, been studying the claims of suitable country towns for planned expansion, both as a means of stimulating and strengthening their own economic life and that of the surrounding countryside, and as a means of assisting the decentralization of industry and population from congested cities. With the object of focusing public attention on this question the committee has arranged a Country Towns Conference which will discuss the present problems and needs for the future. The Conference will be held at the Town Hall, Leamington Spa, on Thursday and Friday, 26th and 27th February, and speakers will include Mr. W. A. Wood, Ministry of Housing and Local Government, and Mr. P. W. Macfarlane, Chairman of the Country Towns Committee.

Applications for the full Conference programme and for tickets, which will cost Members 21*s*. each and non-Members 25*s*., should be made to the Secretary, Town and Country Planning Association, 28, King Street, W.C.2, as soon as possible.

LECTURE ON FUEL

The recent research, carried out at the Fuel Research Station, Greenwich, on space-heaters designed to burn raw bituminous coal smokelessly was the subject of a paper by Mr. L. L. Fox, entitled "Efficiency of Domestic Space-heating Appliances Using Solid Fuel," which appeared in the November, 1952, issue of the *Journal* of the Institute of Fuel. Mr. Fox's paper will be read at a meeting of the Institute of Fuel to be held at the Institution of Mechanical Engineers, Storey's Gate, S.W.1, on Tuesday, 27th January, at 5.30 p.m., and Fellows of the Royal Society of Arts interested in hearing it will be welcome at this meeting.

A limited number of reprints of the original publication are available on application to the Secretary, Institute of Fuel, 18, Devonshire Street, W.1, price 3*s*. 6*d*.

OBITUARY

LORD BROUGHSHANE

We record with regret the death, on the 19th January, of The Right Hon. Sir William Davison, K.B.E., first Baron Broughshane.

Lord Broughshane was elected Member of Parliament for South Kensington in 1918, and held the seat until 1945, when he was raised to the peerage. In his long service in the House of Commons he showed particular concern for the preservation of London architecture and amenities, and it was in recognition of his efforts in this cause that he was in 1926 elected an honorary Associate of the Royal

Institute of British Architects. His public spirit was shown in the many and diverse associations in which he took a leading part; they ranged from the Foundling Hospital, of which he was a Governor, to the Income-tax Payers' Association, of which he was Chairman.

He was elected a Life Fellow of the Society in 1901, and served on its Council continuously from 1909 to 1943, and was a most regular attendant at its meetings. He was Treasurer 1913–17, and again in 1922. He took the Chair at a number of the Society's meetings.

SIR JAMES FRENCH

We record, with sorrow, that Sir James Weir French, D.Sc., died on the 14th January, at the age of 76.

Sir James French was an expert on range-finding and fire-control instruments, and was responsible for developments in naval gunnery, and in instruments designed for the control of aircraft and submarines. After the war of 1914–18 he was attached to the Inter-Allied Commission of Control in Germany. He was an expert also on glass technology, and was deeply interested in ancient glass and in porcelain.

He was elected a Fellow of the Society in 1919.

CAPTAIN A. H. RYLEY

We also record with regret the death of Captain Archibald Hamilton Ryley, C.B.E., Elder Brother of Trinity House (retd.). Captain Ryley was elected a Fellow of the Society in 1940 and became a Member of the Council in 1940, serving as an Ordinary Member until 1943, and as Vice-President until his resignation in 1948. His most important work for the Society was connected with the Thomas Gray Memorial Trust, and he served as Chairman of its Committee from 1939 throughout the war years until his resignation in 1948.

CORRESPONDENCE

PIONEERS OF FLYING MACHINES

From C. H. GIBBS-SMITH, M.A., ROYAL AERO CLUB, 119 PICCADILLY, W.1

Having read Mr. Calder's letter in the last *Journal* about the pioneers of flying, I hasten to ask for space to amend a most unjust impression which I am sure he did not intend—unjust to the great men who came before Lilienthal and Pilcher, and made it possible for them to gain their well-merited fame.

The true father of heavier-than-air flight, and one of the greatest geniuses in aviation, was that remarkable Yorkshire baronet, Sir George Cayley. Already in 1799 he had for the first time in history formulated the basic problems of the aeroplane, and also made experiments with helicopter screws. In 1804 he made and flew his first model glider. In 1809–10 he published (in Nicholson's *Journal of National Philosophy*) his epoch-making researches on the aeroplane, in which he dealt with the centre of pressure, cambered wings, longitudinal and lateral stability, tail-unit control, streamlining, and many other points. Finally in the 'forties he made and tested, once with a boy occupant, full-sized gliders.

Passing over the less important work of other men, we find John Stringfellow building and successfully flying in 1848 the first powered aircraft model in history, which was an improvement on the spectacular design of Henson (1842). In 1866 the Aeronautical Society of Great Britain was founded and a classic, influential, paper on aerodynamics read to it by F. H. Wenham.

In France, Le Bris had got up into the air in a primitive glider about 1854, and

repeated his bold but inconclusive efforts later. In 1857 Félix du Temple put out a prophetic design for an aircraft; and that brilliant and ill-fated man Alphonse Pénaud was conducting his famous research and experiments between 1871 and 1876. There was Tatin's compressed-air driven model of 1879; and Ader's man-carrying monoplane of 1890, which is still the subject of a disputed flight.

Back in England we have Thomas Moy working on cambered wings in 1875; and, in Australia, Hargrave on kites and other lifting surfaces from 1884 onwards. Then, with the accumulated knowledge and experience of these great pioneers, and many more I have no space to mention, there comes upon the scene Otto Lilienthal. The great contribution of this great man was, that between 1890 and 1896 (when he crashed and died) he constructed fixed-wing gliders and actually got into the air and flew them. He took the theory and primitive practice of his predecessors, and made it come alive. He was a giant in aviation, and represents the penultimate phase before the conquest of the air by the Wrights' powered aircraft of 1903.

Percy Pilcher was a fine pioneer, but not in the same class as Lilienthal, whose follower he was, nor his contemporary in America, Chanute. Pilcher made his first glider in 1895 and crashed, fatally, in 1899. His influence on the evolution of flying was not very great, but he contributed valuable evidence about the placing of the centre of gravity and re-introduced (along with other people) the idea of a wheeled undercarriage suggested by Sir George Cayley over seventy years before and by Henson in 1842.

SHORT NOTES ON BOOKS

THE HEART OF THE CITY. *Lund Humphries*, 1952. 50*s*

The Heart of the City was the theme of the eighth Congrès international d'architecture moderne. This book prints the discussion of the form and content of the modern city, what it is, and what it ought to be; this is followed by descriptions of a number of new attempts to solve the problem of "the humanization of urban life"; finally the conclusions of the Congress are summarized.

MOUNTAIN BIRDS. *By R. A. H. Coombes. Penguin Books*, 1952. 4*s* 6*d*

This account of sixteen mountain birds found in Britain, a new *King Penguin*, is illustrated with handsome colour plates by G. E. Lodge.

HANDCRAFT IN WOOD. *By John Hooper. Batsford*, 1952. 21*s*

This "handbook of training in drawing and practical work for teachers, students and craftsmen", as it is described in its sub-title, is a revision of the fifth edition of *Handcraft in Wood and Metal*, which is now being published as two volumes. It is very fully illustrated with photographs and diagrams.

ANIMAL FORMS AND PATTERNS. *By Adolf Portmann. Faber*, 1952. 25*s*

This book, which is translated from a German edition published in Basel in 1948, is described as a study of the appearance of animals. The author discusses variations in appearance of the sexes, and of juvenile and adult forms, and seeks the purpose and meaning of these variations, and the patterns which so many animals bear.

SAPPERS IN THE PERSIAN GULF. *By W. H. Adcock. Bombay, Thacker*, 1952. *Rs.* 10/8.

Colonel Adcock here tells the story of the units of the Royal Engineers and the Indian Engineers who organized the water supply, transport, power, refrigeration and supplies of the base areas and lines of communication of Persia-Iraq Command, which was established in 1941 in what was virtually untouched desert. He is concerned not only with what was done there, but also with how, in face of great difficulties, and by whom, the supply route to Russia was kept open.

FROM THE JOURNAL OF 1853

VOLUME I. *21st January*, 1853

From Miscellanea: Crystal Palace, Sydenham

The slight improvement of late in the weather has been abundantly taken advantage of by the contractors for the New Crystal Palace and its various outlying works; and since our former notice, a striking progress has been made in all directions. A large portion of the building is already covered with glass, of increased weight and strength, and with a marked improvement as to exclusion of the weather. To the north of the centre transept a long range of the less elevated portion has been taken possession of by Mr. Owen Jones, and serves both as a storehouse for the care of casts, which are almost daily arriving from the Continent, and as a workshop for their junction and erection. In one part—the future Egyptian court—Mr. Bonomi and a numerous staff are at work in forming models of Egyptian buildings, and making and arranging casts of the most characteristic of the treasures of Egyptian art possessed by the nation in the British Museum,—*here* to be brought within the comprehension of a larger class than they *there* attract. In another part lies a Venetian gondola, with its quaint ironwork and carving—one day, with its native gondolier, to be an ornament of the sheet of water in the park. At the other end of the works the building is rapidly rising in height, and some of the ribs of the transept roof are in their places, ready for the glaziers to commence their operations almost immediately. From this lofty portion the view on all sides is very striking, from the spires of London and Westminster, on the one hand, to the wooded hills of Kent on the other. The whole of the park is distinctly seen, and some idea is formed of the nature of Sir Joseph Paxton's task. The broad walk is already laid out, and the various basins are all in a state of great forwardness. The sinking of the well is proceeding with great rapidity, and enormous pipes, three feet diameter, for feeding the fountains, are daily arriving on the ground, and being fixed in their proper positions. Further down is the branch line of rails from the Brighton Railway.

Some Meetings of Other Societies

MON. 26 JAN. British Kinematograph Society, at 21, Soho Square, W.1. 7.30 p.m. J. H. R. Coote : *Description of Different Types of Colour Film.*

Electrical Engineers, Institution of, Savoy Place, W.C.2. 5.30 p.m. *The Relative Merits of Harmonic and Intermodulation Measurements for Assessing Distortion in Audio Equipment* (Discussion).

Geographical Society, Royal, S.W.7. 5 p.m. B. H. Farmer : *Problems of Land Use in the Dry Zone of Ceylon.*

Imperial Institute, S.W.7. 5.30 p.m. W. E. Simnett : *British Commonwealth Today : An Introduction to the British Colonial Empire.*

TUES. 27 JAN. Manchester Geographical Society, 16, St. Mary's Parsonage, Manchester, 3. 6.30 p.m. D. L. Niddrie : *The Falkland Islands.*

Registered Architects, Institute of, at the Royal Society of Arts, W.C.2. 7 p.m. C. V. Wallace : *The Work of the National Trust from the Architect's point of view.*

WED. 28 JAN. British Foundrymen, Institute of, at the Waldorf Hotel, W.C.2. 7.30 p.m. E. D. Daybell, P. A. Russell and R. W. Ruddle : *Runners and Risers.*

British Kinematograph Society, at Film House, Wardour Street, W.1. 7.15 p.m. Ian Atkins : *The Use of Film in Television Production.*

Electrical Engineers, Institution of, Savoy Place, W.C.2. 5.30 p.m. A. F. B. Young : *Some Researches on Circuit-Breaking by means of High-Voltage Circuit-breakers, with special reference to Current-Chopping.*

Petroleum, Institute of, 26, Portland Place, W.1. 5.30 p.m. D. T. Germain-Jones : *Geophysics—its Problems and Trends.*

Victoria & Albert Museum, S.W.7. 6.15 p.m. Charles Mitchell : *The Development of Royal Portraiture.*

FRI. 30 JAN. British Sociological Association, at the Royal Society of Arts, W.C.2. 8 p.m. Prof. Barbara Wootton : *Some Social Factors affecting Earned Incomes.*

SAT. 31 JAN. Horniman Museum, Forest Hill, S.E.23. 3.30 p.m. Miss Winifred Brooke : *The Bolivian Andes and its People Today.*

MON. 2 FEB. British Kinematograph Society, at 21, Soho Square, W.1. 7.30 p.m. D. R. T. Dighton : *Sensitometers and Densitometers for use with Colour Materials.*

Geographical Society, Royal, S.W.7. 8.15 p.m. Duncan Carse : *South Georgia Survey.*

Imperial Institute, S.W.7. 5.30 p.m. J. J. Tawney : *British Commonwealth Today : East Africa.*

TUES. 3 FEB. Incorporated Plant Engineers, at the Royal Society of Arts, W.C.2. 7 p.m. D. C. Edwards : *Selection, installation and maintenance of small diesel engines.*

Japan Society of London, at the Victoria & Albert Museum, S.W.7. 5.30 p.m. Giles Bullard : *An Oxford Undergraduate in Japan.*

Manchester Geographical Society, 16, St. Mary's Parsonage, Manchester, 3. 6.30 p.m. John Armitage : *Cyprus and Corsica.*

WED. 4 FEB. British Decorators, Incorporated Institute of, at Technical College, Huddersfield. 7 p.m. H. G. Dowling : *The Challenge of the Contemporary Idiom : Are Decorators equipped to meet it?*

British Kinematograph Society, at Film House, Wardour Street, W.1. 7.15 p.m. F. A. Hoare : *Production Techniques in the making of Educational Films.*

London Society, at the Royal Society of Arts, W.C.2. 5.30 p.m. Ralph Dutton : *Country Houses in the London Area.*

Victoria & Albert Museum, S.W.7. 6.15 p.m. Lawrence E. Tanner : *The Coronation Robes.*

THURS. 5 FEB. Engineering Inspection, Institution of, at the Royal Society of Arts, W.C.2. 6 p.m. G. V. Stabler : *Education and Training for the Inspection Branch of Engineering.*

SAT. 7 FEB. Horniman Museum, Forest Hill, S.E.23. 3.30 p.m. Dr. H. Subandrio : *The Toradja : Peoples of Central Celebes.*